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NOTICES

DARTONFIELD GROUP—VISITORS' DAY

Those who wish to visit the Institute are requested to do so after making an appointment. No special days are set apart as Visitors' Days and the services of the technical officers can be availed of for discussion or demonstration only by prior appointment.

PUBLICATIONS

Rubber Research Institute publications comprising Annual Reports, Quarterly Journals and occasional Bulletins and Advisory Circulars are available without charge to the Proprietors (resident in Ceylon), Superintendents and Local Agents of rubber estates in Ceylon over 30 acres in extent. Advisory Circulars and Small-holdings Leaflets in English or Sinhalese will be available without charge to small-holders on application. Forms of application can be supplied on request.

It will be appreciated if subscribers will return any back publications which are of no use to them.

ADVISORY CIRCULARS

The undernoted Advisory Circulars may be obtained on application at 30 cents per copy. Future issues in the series will be sent free of charge to estates and small-holders registered for the receipt of our publications:—

- (5) Straining box for latex (January, 1940).
- (12) Warm Air Drying House for Crepe Rubber (Reprinted 1952).
- (33) Mechanical Felling of Rubber Trees (Reprinted March, 1955).
- (37A) Manuring—Magnesium Deficiencies in Rubber (July, 1954).
- (37B) Potassium Deficiencies (September, 1954).
- (38) Planting and After-Care of Budded Stumps and Stumped Budgrafts (Superseding Advisory Circular No. 8) (March, 1953).
- (39) Clonal Seed as Planting Material (Superseding Advisory Circulars (No. 26 and 27) (July, 1953).

- (40) Tapping of Hevea Rubber (Superseding Advisory Circulars No. 17 and 34) (June, 1954).
- (41) Pink Disease (June, 1954).
- (42A) New Local Planting Material for Small Scale Trials on Estates (July, 1955).
- (43) Oidium Leaf Disease (Superseding Advisory Circulars No. 22 and 28) (July, 1954).
- (44) Diplodia Dieback and Collar Rot of Hevea and Blue Spot of Crepe Rubber (June, 1954).
- (47) Ustilina Rot of Rubber Trees (November, 1954).
- (49) Root Disease in Replanted Areas (Superseding Advisory Circular No. 31) (October, 1951).
- (50) Orange Gall of Hevea (December, 1954).
- (51) Bird's Eye Leaf Spot of Hevea (December, 1954).
- (52) A Guide to the Cost of Replanting Rubber (December, 1954).
- (56) Cover Crops (Superseding Advisory Circular No. 25) (October, 1955).
- (57) Notes on Rubber Seedling Nurseries (Superseding Advisory Circular No. 35) (October, 1955).
- (58) Notes on Budgrafting Procedure (Superseding Advisory Circular No. 1) (December, 1955).
- (60) Sale of Budwood (Superseding Advisory Circular No. 42) (June, 1958).
- (61) Prevention of Coagulation in the Field (Superseding Advisory Circular No. 53) (September, 1958).
- (62) The White Root Disease of Hevea—Fomes Lignosus (Superseding Advisory Circular No. 46) (October, 1958).
- (63) Brown Root Disease of Hevea—Fomes Noxius (Superseding Advisory Circular No. 48) (December, 1958).
- (64) Bark Rot and Canker of Hevea—Phytophthora Palmivora (Superseding Advisory Circular No. 54) (December, 1958).
- (65) The Phytophthora Leaf Disease of Hevea—Phytophthora Palmivora (Superseding Advisory Circular No. 45) (December, 1958).
- (66) Manuring of Rubber (Superseding Advisory Circulars No. 59 & 59A) (April, 1959).

A METHOD OF INDUCING FLORAL STIMULUS FOR EARLY FLOWERING OF HEVEA BRASILIENSIS

By

C. A. de Silva and L. B. Chandrasekera

In plant breeding work with a perennial crop such as *Hevea* the plant breeder may have to wait six or seven years for the progeny of successive generations of crosses to reach maturity for natural flowering.

A reliable method of inducing flowering in young rubber plants at an early stage would result in a considerable saving of time for the plant breeder to obtain by hand pollination material possessing the desired characters of vigour, yield and disease resistance.

This paper describes a method to induce early flowering in young budded plants of *Hevea brasiliensis*.

Hevea is monoecious, *i.e.* both male and female flowers are borne on the same tree. Depending on the genetic constitution and the environmental conditions, the male flowers of *Hevea* may shed pollen before the female flowers are open or the female flowers may be open before the pollen is sufficiently mature for fertilization. The periods of flowering may also vary from clone to clone during the flowering season.

These factors present difficulties in plant breeding work involving specific crosses between selected clones and must be considered when devising breeding programmes. The successful inducement of early and, in some cases, continuous flowering in young *Hevea* budded plants could considerably minimize these difficulties.

Horticulturists have claimed that the downward training of branches of fruit trees reduces vegetative growth and promotes flowering. Studies on "gravimorphism" in trees indicate the effects of gravity on growth, apical dominance and flowering in fruit trees.

Work carried out by Wareing and Nasr (1) at the University of Manchester has shown that two-year-old stool-bed layers of apple stocks grown in a normal vertical position initiate relatively few flowers but the layers grown horizontally show heavy flowering on the spurs of the shoots.

Similar experiments on methods of inducing floral stimuli in *Hevea* have been tried out in 1954 at the Institut des Recherches sur le Caoutchouc en Indochine (2).

The disease-resistant *Hevea* material recently introduced into Ceylon for breeding work could be used, as young budgrafts, for inducing early flowering with the object of accelerating breeding work.

It should also be possible to considerably reduce the period of commencement of flowering by crown-budding or branch-budding with the required material on

pollarded mature trees of Hevea. Finally, there is the possibility of using flower hormones as a spray for inducing early flowering. These methods are being tried out in the course of our breeding work with Hevea.

Photoperiodic induction methods have been tried out in our preliminary investigations but with inconclusive results. Further attempts will be made under greenhouse conditions.

The present investigation for early flowering of Hevea possibly combines the action of "gravimorphism" and of ringbarking. Sufficient controls were unfortunately not introduced to differentiate clearly between these two treatments. It is known, however, that a severe set-back to a plant caused by ringbarking or root disease does induce precocious flowering and fruiting.

Method of Planting.—Budded stumps of three clones were planted about 6 to 8 feet apart in rectangular pits in nursery beds. The stumps were inclined about 45° to the horizontal with the budpatch about 2" below ground level or just above ground level. Figs. 1 and 2 give the diagrammatic details of the position of the stumps at the time of planting, and the subsequent development of the bud shoot.

Each planting hole was initially manured with 20 lb. of cattle manure, and no further manuring was done throughout the experiment. A summary of the details of planting is given below:—

	Clone	Number of budded stumps planted	Date of planting	Number surviving
	FX 25	5	30.6.56	1
	FX 2784	5	30.6.56	3
	RRIC 52	13	6.8.56	6

Fig. 1

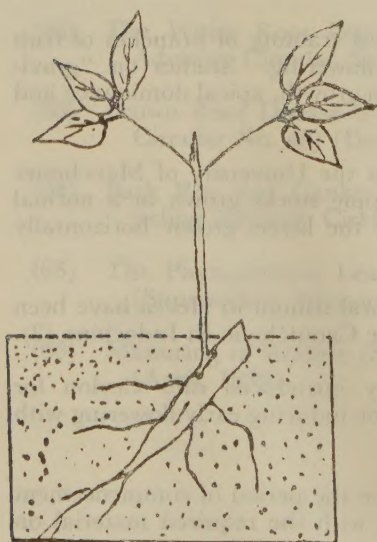
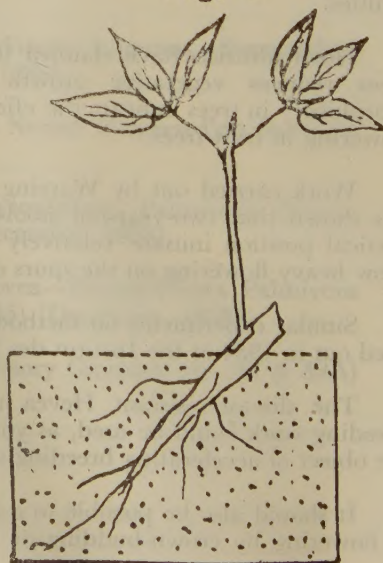


Fig. 2



Preliminary Treatments.—When the budshoots had developed to a height of 4 feet above ground level they were bent into a horizontal position. The bending was done according to the natural slant of the stem inwards towards the snag end of the stock to prevent breakage. All secondary shoots were allowed to develop and these in time were also bent to a horizontal position. The bending was done by means of coir-rope tied at a point on the stem protected with a padding of coir-fibre and fastened to a peg in the ground. This can be seen in plate 1 near the white screen in the background. One plant of clone FX 2784 was allowed to grow without bending the main stem or branches. This plant is seen in the right foreground of plate 2.



Plate 1



Plate 2

In June, 1957, all plants, except one from clone RRIC 52, were ringbarked at a height of 6" above the graft union, as shown in Plate 3. In December, 1958, two plants of clone RRIC 52 sent out new shoots below the ringbarked area (Plate 3) and these shoots were allowed to grow out without interference. The growth of these shoots did not affect the rate or time of flowering of the plants, but there were indications of a healthier condition in the plants with the side shoots. No flowers were observed on these new shoots at any period during the investigations.

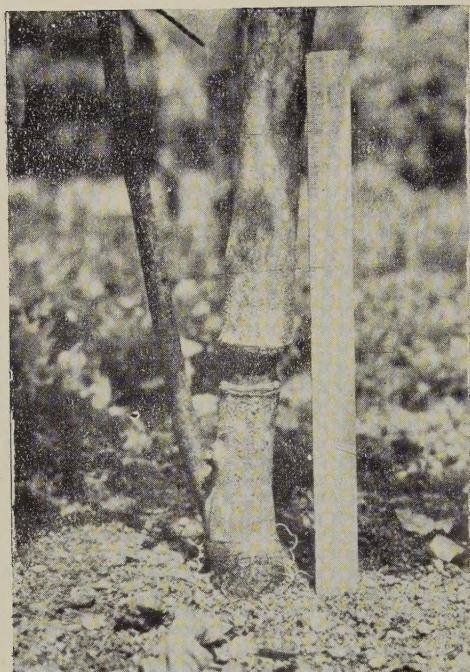


Plate 3



Plate 4

Results.—Flowering was first observed in a plant of clone FX 2784 in September, 1958, sixteen months after ringbarking and at $2\frac{1}{4}$ years of age. In September-October of the same year all the clones started to flower, except two plants one of which was not ringbarked (Plate 4), and the other in which the branches were not bent but the main stem was ringbarked (Plate 2).

The flowers were mainly concentrated on the small lateral shoots that arose from the bent branches, as seen in Plate 5.

Placing the budpatch above or below the ground had no effect on flowering. The flowers were more profuse on clone RRIC 52.

The duration of flowering in the two FX clones was relatively short compared with that in clone RRIC 52. The FX clones ceased to flower in June, 1959. Flowering in the plants of clone RRIC 52 has been continuous for eleven months and the clone was still flowering in October, 1959. The profuse flowering in clone RRIC 52 is seen in Plate 5.

The fruit set was extremely poor in the FX clones. It is possible that this may be due to the unfavourable weather conditions for fruit set that prevailed during 1959. Only four fruits were observed in 4 plants of the FX series.

In clone RRIC 52 the fruit set was prolific (Plates 1 and 6). In one inflorescence there were 32 sets but only 12 fruits reached maturity due mainly to heavy *Phytophthora* infection caused by continuous wet weather in the S.W. monsoon period of 1959. These conditions may partially account for the poor results obtained in the FX clones.

During the 1959 pollination season 60 test crosses were made on these plants of clone RRIC 52 using clone FX 2784 as the male parent and 7 sets were obtained. Four fruits were destroyed by *Phytophthora* and 3 fruits reached maturity. Nine seeds were obtained of which 4 have germinated and are now growing as young seedlings.



Plate 5

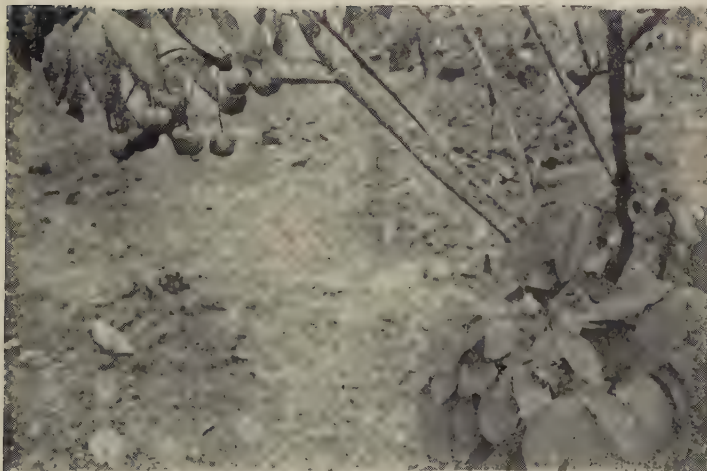


Plate 6

The results are shown in tabular form below:

Clone	No. of plants	Date of planting	Method of planting	Treatment	Flowering	Fruit set
FX 25	1	30.6.56	Inclined with bud patch 2" below soil level	Ring-barked and branches bent down	From Sept., 1958 to June, 1959	very poor
FX 2784	2	30.6.56	"	"	"	"
FX 2784	1	"	"	Ring-barked only	No flowering	—
RRIC 52	1	6.8.56	Inclined with bud patch 2" above soil	Not ring-barked but the branches were bent down	No flowering	—
RRIC 52	2	"	"	Ring-barked and branches bent down	Continuous from Nov., 1958	Very heavy
RRIC 52	3	"	Inclined with bud patch 2" below soil level	"	"	"

Summary.—Preliminary investigations have been carried out with ring-barking, "gravimorphic," and photoperiodic methods for inducing floral stimuli for the early flowering of *Hevea brasiliensis*.

The more successful methods resulting in early flowering of approximately 2-year-old *Hevea* budded plants, with fruit set and final germination of seed, are described.

Acknowledgment.—The authors have to acknowledge the help and co-operation of Messrs. L. P. de Mel and H. A. Mendis of the field staff of Nivitigalakele Station, in attending to the field operations throughout these investigations.

References:

1. WAREING, P. F. & NASR, T. *Nature*, 1958, **182**, 379.
2. CAMPAIGNOLLE, J. & BOUTHILLON, J. *Rapp. annu. Inst. Rech. Caoutch. Indoch.*, 1954, 64.

A NOTE ON A SIMPLE METHOD OF CONTROL OF LATEX COAGULATION

By

K. F. Heinisch

The amount of acid required for coagulation of latex is not a constant figure but depends on various factors such as the amount and type of anticoagulant used in the field, the nature of the clone, the weather, the quality of the water used, the distance to the factory, the dilution, the time of coagulation, etc., and may therefore vary from day to day. These factors make it difficult for the rubber maker to determine daily the optimum amount of acid required for coagulation. Experience may enable him to estimate the required amount, but sometimes this results in too much acid giving a hard coagulum, which may cause difficulties in the milling of sheets, or in too little acid, resulting in a milky serum entailing a loss in rubber and a liability to bacterial action.

Both extremes, too much or too little acid, may influence the quality of the final product and reduce the outturn of first grade rubber. A well performed coagulation should give a clear or slightly opaque, yellowish coloured serum.

The coagulation of latex by the addition of acids is a result of the precipitation of the protective layer of proteins around the rubber globules in the latex by a lowering of the pH. Proteins in alkaline solution (high pH value) have a negative electric charge and in acid solution (low pH) a positive electric charge. Between these exists a certain pH, the so-called iso-electric point, where the electric charge is zero and the precipitation of the rubber particles, having the electric charge of the protective layer, occurs. This minimum solubility of the latex proteins is in the region of pH 4.5 to 4.8.

Depending on the required hardness of the coagulum, *viz.*, for sheet or crepe manufacture, and the milling, *viz.*, the same day or the following day, the suitable pH for coagulation is therefore approximately between 4.4 to 4.8. In order to ensure a proper coagulation it is therefore desirable to control the pH of the latex after the addition of the coagulant. A simple and quick determination of the pH can be done by means of Bromo Cresol Green indicator, which changes colour according to the pH from blue through bluish-green and yellowish-green to yellow.

A coagulation at a pH of 4.8 proceeds quite slowly, resulting in a soft coagulum suitable for sheet manufacture. The serum may be slightly milky and the colour of the B.C.G. indicator paper will be bluish-green. If the pH is lowered to 4.6 the serum will be clear and the coagulum would be suitable for sheet or crepe manufacture. The colour of the B.C.G. indicator paper will be green. A lowering of the pH to 4.4, giving a yellowish-green colour of the indicator paper produces a clear serum and a harder coagulum suitable for crepe manufacture. A blue colour of the indicator paper indicates insufficient acid and a yellow colour indicates an excess of acid.

Bromo Cresol Green test papers are best used by skimming the surface of the paper strip over the latex. One side will be coated with the latex and the colour indicating the pH will be clearly visible on the other side. Dipping into the latex will obscure the colour. If the latex is spotted on the indicator paper, the spot produced may vary in colour from the centre outwards, and some difficulties may be experienced in deciding the correct shade showing the actual pH.

Bromo Cresol Green indicator papers can be obtained in limited amounts from the Rubber Research Institute.

This article will shortly be issued as an Advisory Circular illustrated with a colour chart of pH values for use in the rubber factory.

REPORT ON THE SULPHUR DUSTING OF SMALLHOLDINGS IN 1958/59

By

Ronald T. Wijewantha

Introduction:

The reports on the Sulphur Dusting of Smallholdings submitted by me for the dusting seasons 1956/57 and 1957/58 carried details of the past history of Co-operative Dusting and also a general outline of the methods adopted. (Reference 1 and 2). It is therefore not considered necessary in this report to recapitulate further in regard to the scope of this Scheme.

Organization:

In my proposals for Co-operative Sulphur Dusting in 1958/59, it was stated that due to various factors, expansion of the Scheme according to the earlier 5 Year Plan would perhaps be difficult. It was, however, hoped that with a special effort it would be possible to extend the Scheme by a further 25%. I am pleased to report that, with the co-operation of my field staff, this target has been reached.

Several modifications and alterations to the Dusting Scheme were made in 1957/58. These had resulted in a streamlining of dusting procedure and technique, so that throughout the dusting season the scheme worked smoothly and according to plan. In 1958/59 therefore no further major changes were considered necessary. The formation of tentative groups, however, was initiated about one month earlier than in the previous years.

The Sulphur Dusting Scheme was advertised in the Press by the usual notification in both Sinhala and English on 10th and 12th September, 1958. An attractive leaflet on dusting, as well as application forms, were issued to field staff for distribution among the smallholders about the same time.

The response from the public—except in the Kalutara District—was poor. Only intensive and local propaganda by the field staff enabled the formation of the required number of groups. Although applications were received from 69 groups at the start, only 67 finally participated (Table I). One group in the Kegalla District defaulted in making payments. In the Matara District several smallholders in 2 groups at Imaduwa and Ibbawala cried off. The remaining smallholdings in the 2 groups were then amalgamated to form the combined Imaduwa-Ibbawala group.

TABLE I

DISTRIBUTION OF DUSTING GROUPS		
District	No. of Groups 1957/58	No. of Groups 1958/59
Kalutara ...	15	17
Colombo ...	12	14
Kegalla ...	9	15
Ratnapura ...	6	9
Galle ...	6	8
Matara ...	3	3
Kandy ...	—	1
TOTAL ...	51	67

Even in those groups which were 'accepted,' considerable difficulty was experienced in the collection of money for sulphur dust and 'other expenses.' In many instances the author or the District Field Officer had to personally intervene and persuade the smallholders, including in some cases the Group Organizers, not to withdraw from the Scheme. As in the previous year, it was the 50% subsidy on dusting sulphur that served as the biggest attraction in persuading smallholders to join the Scheme.

Sixty seven groups, comprising $6,246\frac{3}{4}$ acres, participated in Co-operative Sulphur Dusting in 1958/59. (Table II and Annexures 1 and 2).

TABLE II

District	A C R E A G E	
	1957/58	1958/59
Kalutara ...	1,539	$1,669\frac{1}{2}$
Colombo ...	$1,211\frac{1}{4}$	$1,360\frac{1}{4}$
Kegalla ...	$734\frac{1}{2}$	$1,248\frac{1}{2}$
Ratnapura ...	$554\frac{1}{4}$	$856\frac{1}{4}$
Galle ...	516	$731\frac{3}{4}$
Matara ...	$226\frac{3}{4}$	310
Kandy ...	—	$70\frac{1}{2}$
TOTAL ...	$4,781\frac{3}{4}$	$6,246\frac{3}{4}$

Altogether 1,884 holdings were dusted as against 1,741 holdings in 1957/58. It is pleasing to record that more *genuine* smallholders are now taking part in the Scheme.

The largest acreage to be dusted in a district was, as in previous years, at Kalutara (1,669½ acres), and the smallest in the Kandy District which was a newcomer to our Scheme. The single dusting group here was organized with the greatest difficulty, as the Kandyan peasants were rather reluctant to join a Scheme which in their view and in their opinion had so far not proved itself. The smallholders of Hataraliyadda in Galagedera range who had already formed themselves into a Rubber Producers' Society were finally with much persuasion practically forced to participate. It speaks much for the working of the Scheme that half-way through the dusting season, many neighbouring smallholders wished to get their holdings included for dusting even at this late stage.

The distribution of sulphur dusting machines was commenced on 8th December, 1958, and completed on 16th December. In all 79 machines were distributed, of which the extra machines were left with the District Field Officers to serve as stand-by machines in case of unexpected mishaps and breakdown. The issue orders for sulphur dust were also despatched on 8th December to various groups.

It was considered necessary to hold dusting demonstrations only for the *newly* formed groups. These training classes were completed by 15th January, 1959.

Detailed instructions were given to field staff on dusting methods by the author in early December. A confirmatory instructional leaflet was issued on 18th December, 1958.

In many cases, even during finalising of activities, difficulties arose and it became necessary for the author to proceed to the spot and straighten out the problems.

It was thus possible to have everything more or less ready for commencement of dusting when refoliation set in.

Dusting Operations:

As in 1958, commencement of wintering during the dusting season under report was later than usual. The earliest holding to be dusted was in the Undugoda dusting group, Kegalla District, where dusting was commenced on 13th January, 1959. In the majority of the groups dusting was possible only from about early February, and in the Morapitiya group in the Kalutara District, wintering was so late that dusting was postponed till 1st March.

Except in the Colombo District where both types of dusting machines were used, the groups in the rest of the districts were issued with Mistral machines. Although some mechanical breakdowns were reported, the dusting programme was not unduly upset in any group, as the stand-by machines which were with the District Field Officers were put to use.

Dusting was completed first in the Malwana group on 6th March, 1959. This neighboured the Undugoda group which was the first to start dusting this season.

The last to complete dusting was the one at Rathmale (Kalutara District) where dusting was finally concluded on 10th April, 1959.

The average cost of dusting an acre (excluding cost of sulphur) showed a very slight decrease—Rs. 4.94, against Rs. 5.06 last year (Chart I). This was mainly due to the fact that Group Organizers in several cases had helped to transport the dusting machines in their own vehicles at a nominal rate.

As in previous years, most Group Organizers remained mere figure-heads. The few who took a real interest in the work, co-operated fully with the Rubber Instructors and it was these groups that showed a lower rate of incidental expenses.

The Machine Operators continued to function satisfactorily and in most cases helped the Rubber Instructors considerably.

The attitude of smallholders has not changed much from that reported in previous years. A contributory factor has been the fact that the incidence of Oidium was comparatively mild in recent years. There is no doubt that the subsidy on sulphur contributed to a great extent in making this scheme a success.

Weather and Incidence of Oidium:

Wintering was very erratic during the season under review, as is evident from the dusting chart (chart II). Weather conditions, however, generally did not favour Oidium.

Climatic conditions were also on the whole favourable for successful dusting, although in a few cases in the Kalutara and Galle Districts the dusting schedule was slightly affected by early morning showers.

The holdings situated at higher elevations generally wintered and refoliated earlier than the rest.

As is usual with this Leaf Disease, the early winterers escaped an attack of Oidium completely. The late wintering ones were affected slightly.

Once again holdings along the coastal belt, which wintered later than the others, were generally attacked by Oidium.

Results:

The Sulphur Dusting Scheme organized by the Smallholdings Department continued to be a success. All smallholdings which came under the co-operative scheme were satisfactorily dusted.

Although in the districts where weather conditions did not favour Oidium much difference could not be seen between dusted and undusted holdings, the opposite was the case in the other areas, notably along the coastal belt. In this sector, those which joined the dusting scheme were successfully protected, showing, at the most, only a negligible leaf fall or only slight spotting whereas the others were much more severely affected and showed considerable leaf fall.

Summary:

Number of holdings dusted	...	...	1,884
Acreage dusted ...	...	...	6,246 $\frac{3}{4}$
Number of groups functioned	...	...	67
Number of acres per machine (average)	...	...	93
Size of the smallest holding	...	...	$\frac{1}{4}$ (acre)
Size of the largest holding	...	...	31 (acres)
Average number of holdings in a group	...	...	28
Average size of a holding	...	...	3 $\frac{1}{8}$ (acres)

A total of 6,246 $\frac{3}{4}$ acres in 1,884 holdings were dusted in the 1958/59 season. This constitutes the largest acreage of smallholdings to be dusted in one season.

Nearly 70% of these holdings were below 10 acres each in extent, and therefore qualified for receipt of sulphur dust at the subsidised rate.

The individual holdings varied in size from $\frac{1}{4}$ acre (smallest) to 31 acres (largest.) The number of holdings in a single group varied from 6 to 61. The average size of a holding was $3\frac{1}{3}$ acres in extent. As in previous years most of the rubber to be dusted was budded rubber (4,999 $\frac{1}{2}$ acres). In addition 466 $\frac{1}{4}$ acres seedling and 781 ordinary but high-yielding rubber were also dusted (Annexure 3). A summary of the dusting work in 1958/59 is attached as Chart II.

Follow-up:

To obtain a general picture of the efficacy of group sulphur dusting, and the opinion of individual smallholders, a questionnaire was sent to all Group Organizers and Rubber Instructors in charge of groups. They were required to obtain detailed information on the present position in every smallholding and to forward separate reports in respect of every individual land. The questionnaire with a summary of their replies is attached as Annexure 4.

This survey showed that the dusted holdings were *markedly superior* to undusted holdings. Of 1,884 holdings sulphur dusted, 1,781 areas, comprising 94.5%, showed much better foliage than the undusted ones. 1,824 (96.8%) holdings were to all intents and purposes entirely free of Oidium. Only 20 of the holdings showed defoliation of over 5% due to Oidium. The clearest proof of the success of this Scheme is the fact that over 96% of the owners had expressed their desire to get their holdings dusted next season as well.

Suggestions for future dusting seasons:

Mechanic:—With the envisaged annual increase in the number of sulphur dusting groups and consequent increase in the number of dusting machines, it would be uneconomical and impracticable to transport machines down to Colombo and back at the end of each season. It is therefore suggested that it would be much more economical to recruit a trained mechanic to service and maintain these machines. He would be required to move from range to range in between dusting seasons for this purpose. His services will also be available to effect running repairs where necessary during the actual dusting season. This would help considerably, as machine breakdowns could otherwise interrupt our dusting programme during the season.

Collection of money:—Collection of money, for sulphur dust and for other expenses, continues to be difficult. It is therefore proposed to commence formation of groups even earlier than last year. It is also suggested that money be collected for these two items in two separate instalments. Collection of money for sulphur dust to be completed by the end of September and of money to meet incidental expenses by the end of November.

Spot dusting:—As suggested in my last report, (Reference 2) 'spot dusting' was done away with during the last season, without any deterioration in the usual standard of dusting. It is therefore thought feasible to discontinue this practice of spot dusting in future seasons as well.

Acknowledgments:

It gives me pleasure to acknowledge the excellent work done by my field staff who worked long and hard to make Co-operative Sulphur Dusting a success. I also must thank the many Group Organizers who contributed in no small measure

towards the successful organization and working of the Scheme. My thanks are also due to the members of my office staff for their assistance.

References:

1. WIJEWANTHA, R. T.—Sulphur Dusting Report 1956/57—Rubber Research Institute of Ceylon. Quarterly Circular—Vol. 33, Parts 3 & 4, December, 1957 (p. 63).
2. WIJEWANTHA, R. T.—Sulphur Dusting Report 1957/58—Rubber Research Institute of Ceylon. Quarterly Circular—Vol. 34, Parts 3 & 4, November, 1958 (p. 63 & p. 72).

ANNEXURE I

C E Y L O N

SULPHUR DUSTING SCHEME 1958/59

showing

Distribution of Dusting "Groups"



ANNEXURE 2

PROGRESS IN SULPHUR DUSTING OF SMALLHOLDINGS

1956/57 — 1957/58 — 1958/59

Acres 2100

1800

1500

1200

900

600

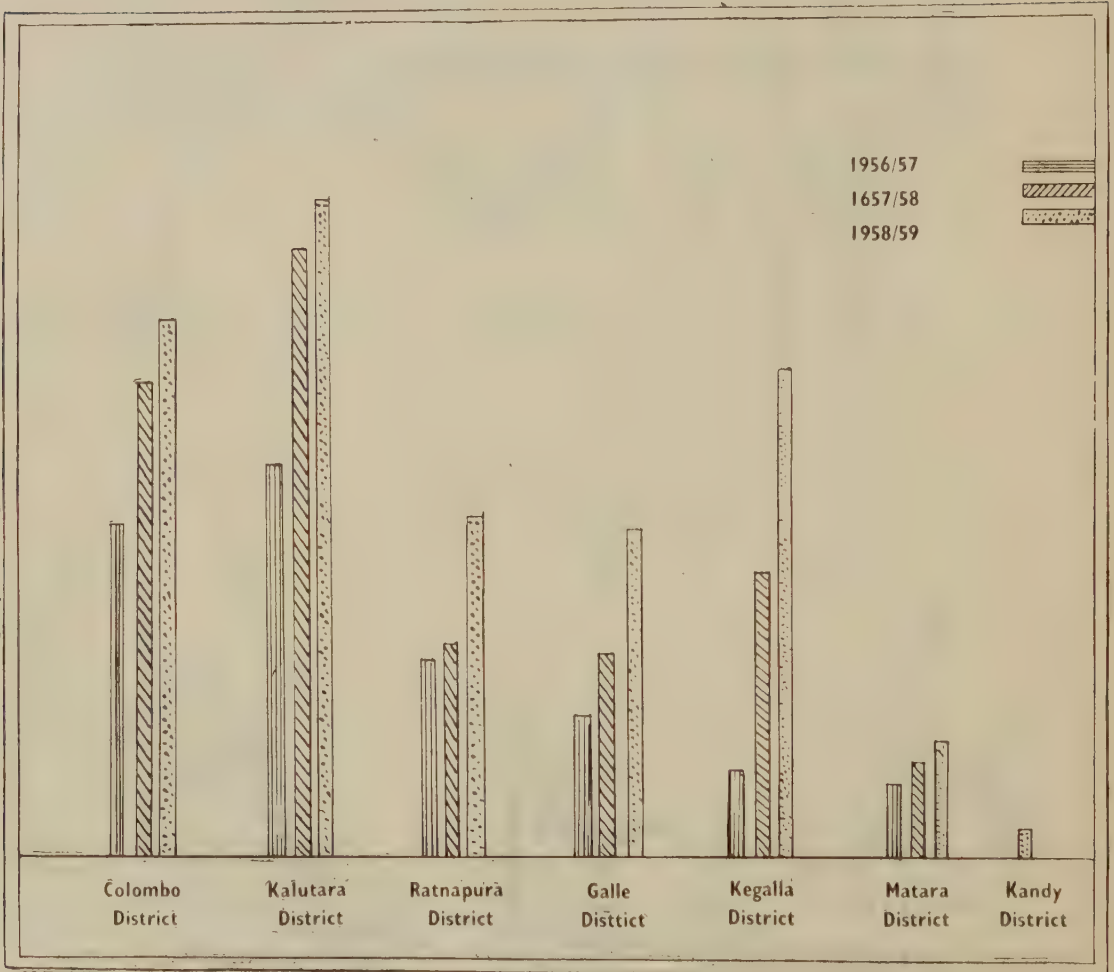
300

0

1956/57

1957/58

1958/59



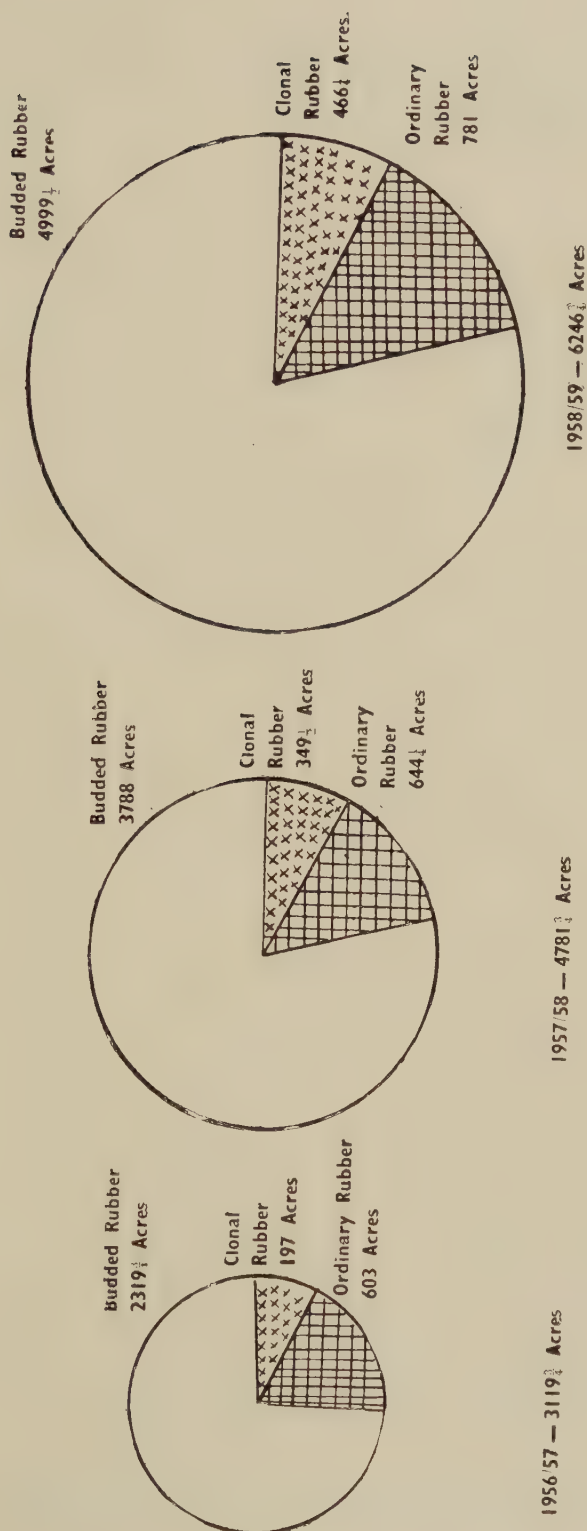
1956/57 Dusting Season—3119½ Acres

1957/58 —do— 4781½ ..

1958/59 —do— 6246½ ..

ANNEXURE 3

RUBBER AREAGES SULPHUR-DUSTED — CLASSIFIED ACCORDING TO KIND OF RUBBER



QUESTIONNAIRE	DISTRICT							
	NAME OF GROUPS		Talangama	Dompe	Gampaha	Lunugama	Mandawala	Beeralakota
	NO. HOLDINGS		35	24	29	39	37	3
1. Does the foliage of the dusted trees show less Oidium than the foliage of neighbouring undusted trees?	YES:—		35	24	—	—	37	—
	NO:—		—	—	29	39	—	—
2. Is the dusted foliage entirely free of Oidium or partly free and if the latter to what extent?	95-100% FREE:—		35	24	29	39	37	—
	90-95% FREE:—		—	—	—	—	—	—
	BELOW 90% FREE:—		—	—	—	—	—	—
3. Is there any leaf-fall of dusted foliage and to what extent?	BELOW 5%:—		35	24	29	39	37	—
	ABOVE 5%:—		—	—	—	—	—	—
4. Is the foliage in undusted areas as badly infected with Oidium this year as in 1958?	YES:—		21	24	—	39	37	—
	NO:—		14	—	29	—	—	—
5. Will the Smallholder like to join the Dusting Scheme next year as well?	YES: -		35	24	25	39	36	—
	NO: -		—	—	2	—	—	—
	NOT YET DECIDED:—		—	—	2	—	1	—

		KEGALLA																				
Domdagoda	Poruwedanda	TOTAL	Kahagalla	Indurana	Medagoda	Waharaka	Undugoda	Malwana	Bulathkohupitiya	Meedeniya	Aranayaka	Kitalangamuwa	Algama	Dedigama	Nelundeniya	Aluthnuwara	Lewangama	TOTAL	Pitigala	Hiniduma	Weerapana	
27	40	473	61	41	34	38	27	45	21	44	17	32	15	48	52	24	22	521	11	18	14	
27	40	473	61	41	34	38	27	45	21	44	17	32	15	48	52	24	22	521	11	18	14	
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
27	40	458	61	41	34	38	27	45	21	44	17	32	15	48	52	24	22	521	11	18	14	
—	—	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
27	40	462	61	41	34	38	27	45	21	44	17	32	15	48	52	24	22	521	11	18	14	
—	—	11	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
27	40	290	—	—	—	—	—	—	—	—	—	32	—	—	—	—	22	54	11	—	14	
—	—	183	61	41	34	38	27	45	21	44	17	—	15	48	52	24	—	467	—	18	—	
27	40	473	61	41	34	38	27	45	21	44	17	32	15	48	52	24	22	521	11	18	14	
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

AND MATARA							TOTAL	RATNAPURA								TOTAL	KANDY		COLOMBO DISTRICT		
Magedera	Kahaduwa	Horangalla	Mapalagama	Morawaka	Siyambalagoda	Inaduwa-Ibbawala		Malwala	Wilakoladeniya	Batatota	Kuruwita	Teppanawa	Mudunkotuwa	Eheliyagoda	Ellawala		Dippitigala	Hataraliyadda	TOTAL	TOTAL	
9	31	18	15	8	17	12	164	23	18	13	17	23	41	31	22	41	229	42	42	455	
9	31	18	15	8	17	12	164	23	18	13	17	23	41	31	22	41	229	42	42	352	
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	103	
9	7	11	1	8	17	12	119	23	18	13	17	23	41	31	22	41	229	42	42	455	
—	17	6	11	—	—	—	34	—	—	—	—	—	—	—	—	—	—	—	—	—	
—	7	1	3	—	—	—	11	—	—	—	—	—	—	—	—	—	—	—	—	—	
9	25	18	12	8	17	12	155	23	18	13	17	23	41	31	22	41	229	42	42	455	
—	6	—	3	—	—	—	9	—	—	—	—	—	—	—	—	—	—	—	—	—	
9	—	18	—	8	17	12	100	23	18	13	17	23	41	31	22	—	188	42	42	229	
—	31	—	15	—	—	—	64	—	—	—	—	—	—	—	41	—	41	—	—	226	
9	31	18	15	8	17	12	164	23	18	13	17	23	41	31	22	41	229	38	38	395	
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1	6	
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	3	54	

MBO ICT	KALUTARA DISTRICT		KEGALLA DISTRICT		GALLE AND MATARA DIS:		RATNAPURA DISTRICT		KANDY DISTRICT		GRAND TOTAL	PERCENTAGE
PERCENTAGE	TOTAL	PERCENTAGE	TOTAL	PERCENTAGE	TOTAL	PERCENTAGE	TOTAL	PERCENTAGE	TOTAL	PERCENTAGE		
—	473	—	521	—	164	—	229	—	42	—	1,884	—
77.36	473	100	521	100	164	100	229	100	42	100	1,781	94.53
22.64	—	—	—	—	—	—	—	—	—	—	103	5.47
100	458	96.83	521	100	119	72.56	229	100	42	100	1,824	96.81
—	15	3.17	—	—	34	20.73	—	—	—	—	49	2.61
—	—	—	—	—	11	6.71	—	—	—	—	11	.58
100	462	97.67	521	100	155	94.51	229	100	42	100	1,864	98.94
—	11	2.33	—	—	9	5.49	—	—	—	—	20	1.06
50.33	290	61.31	54	10.36	100	60.97	188	82.1	42	100	903	47.98
49.67	183	38.69	467	89.64	64	39.03	41	17.9	—	—	981	52.02
86.81	473	100	521	100	164	100	229	100	38	90.48	1,820	96.6
1.32	—	—	—	—	—	—	—	—	1	2.38	7	.38
11.87	—	—	—	—	—	—	—	—	3	7.14	57	3.02

COST OF SULPHUR AND LABOUR

CHART I

Name of Dusting Group	Wages per Labourer per day Rs. cts.	Wages per Operator per day Rs. cts.	Other Expenses Cost per Acre Rs. cts.	Total Cost of Dusting per Acre Rs. cts.
Talangama	2.50	2.75	5.00	11.05
Dompe	3.50	4.00	4.61	10.62
Gampaha	3.50	4.00	5.00	12.71
Lunugama	2.50	3.00	4.78	10.83
Mandawala	2.50	3.00	4.71	11.34
Pasyala	2.50	—	5.81	11.86
Kahatuduwa	3.00	4.00	4.43	11.15
Pelanwatta	2.50	3.00	3.62	9.67
Makandana	3.50	—	5.00	11.05
Padukka	3.00	3.00	5.02	13.34½
Jaltara	3.50	3.00	5.76½	13.32½
Kosgama	3.00	3.25	4.95	13.06
Kaluaggala	3.00	3.25	4.93	14.01
Mawalgama	3.00	3.25	4.90	11.57
Bandaragama	3.00	3.50	2.97	11.05
Uduwa	3.25	3.75	4.86	13.19
Talagala	3.25	3.75	4.90	11.50
Kotapitiya	2.50	3.00	5.39	11.44
Badureliya	3.00	3.50	5.00	11.05
Morapitiya	3.00	3.50	5.01	11.06
Kitulgoda	3.00	3.50	5.00	11.93
Welgama	2.50	2.75	5.22	11.27
Ratmale	2.50	3.00	5.56	11.61
Horawala	2.50	3.00	4.95	13.71
Dodampapitiya	2.50	3.00	4.42	14.12
Tundola	2.50	3.00	4.42	15.99
Halwala	2.50	3.00	4.66½	12.44½
Lihiniyawa	3.50	4.00	5.00	14.66
Kalupahana	2.50	3.00	4.93	11.70
Dombagoda	2.50	3.00	5.22	11.27
Poruwedanda	3.00	4.00	5.92	12.94
Kahagalla	3.00	3.50	5.02	11.07
Indurana	2.75	3.50	4.60	10.65
Medagoda	3.00	3.50	4.76	10.81
Waharaka	3.00	3.50	4.58	10.63
Undugoda	3.00	3.50	5.95	12.00
Malwana	3.00	3.50	5.00	11.05
Bulathkohupitiya	3.00	3.50	5.00	11.05
Meedeniya	3.00	3.50	5.02	11.09
Aranayaka	2.50	3.00	3.89	12.42
Kitalangamuwa	3.00	3.50	4.86	10.91
Algama	3.00	3.50	4.90	13.62
Dedigama	3.00	3.50	5.00	11.05
Nelundeniya	3.00	3.50	5.00	11.87
Aluthnuwara	2.50	3.00	5.00	11.05
Lewangama	2.50	3.00	4.96	11.01
Pitigala	2.50	3.00	4.95	11.34
Hiniduma	2.50	3.00	5.21	14.69
Weerapana	2.50	3.00	5.43	17.70
Morawaka	2.50	2.50	5.23	16.84
Talgampola	2.50	3.00	4.71	13.90
Kahaduwa	2.50	2.50	4.52	11.45
Magedera	2.50	3.00	5.30	15.63
Horangalla	2.50	2.50	4.01	13.16
Mapalagama	2.50	2.50	5.10	11.94
Siyambalagoda	2.50	3.00	5.15	16.71
Imaduwa-Ibbawala	2.50	3.00	4.56	14.30
Malwala	5.00	5.00	5.90	14.47
Wilakoladeniya	3.00	3.50	5.05	13.82
Batatota	2.75	3.00	5.50	15.67
Kuruwita	3.00	3.50	4.95	14.36
Teppanawa	2.50	3.00	4.50	11.66
Mudunkotuwa	2.50	3.00	5.24	12.17
Eheliyagoda	3.00	3.50	4.87	10.93
Ellawala	3.00	3.50	4.97	14.83
Dippitigala	2.50	3.00	5.00	11.19
Hataraliyadda	2.50	3.00	5.25	11.30

Name of District	Name of Dusting Group	Rubber Instructor's Range	No. Holes in a C
Colombo	Talangama	Talangama	2
Colombo	Dompe	Dompe	2
Colombo	Gampaha	Gampaha	2
Colombo	Lunugama	Pugoda	2
Colombo	Mandawala	Pugoda	2
Colombo	Pasyala	Pasyala	2
Colombo	Kahatuduwa	Kesbewa	2
Colombo	Pelanwatta	Kesbewa	2
Colombo	Makandana	Kesbewa	2
Colombo	Padukka	Padukka	2
Colombo	Jaltara	Padukka	2
Colombo	Kosgama	Kosgama	2
Colombo	Kaluaggala	Kosgama	2
Colombo	Mawalgama	Kosgama	2
Kalutara	Bandaragama	Bandaragama	2
Kalutara	Uduwa	Horana	2
Kalutara	Talagala	Horana	2
Kalutara	Kotapitiya	Dodangoda	2
Kalutara	Baduraliya	Baduraliya	2
Kalutara	Morapitiya	Baduraliya	2
Kalutara	Kitulgoda	Baduraliya	2
Kalutara	Welgama	Bulathsinhala	2
Kalutara	Rathmale	Migahatenna	2
Kalutara	Horawala	Matugama	2
Kalutara	Dodampapitiya	Matugama	2
Kalutara	Tundola	Matugama	2
Kalutara	Halwala	Matugama	2
Kalutara	Lihiniyawa	Matugama	2
Kalutara	Kalupahana	Matugama	2
Kalutara	Dombagoda	Neboda	2
Kalutara	Poruwedanda	Ingiriya	2
Kegalle	Kahagalla	Kegalla	2
Kegalle	Indurana	Ruwanwella	2
Kegalle	Medagoda	Ruwanwella	2
Kegalle	Waharaka	Ruwanwella	2
Kegalle	Undugoda	Undugoda	2
Kegalle	Malwana	Undugoda	2
Kegalle	Bulathkohupitiya	Undugoda	2
Kegalle	Meedeniya	Hettimulla	2
Kegalle	Aranayake	Hettimulla	2
Kegalle	Kitalangamuwa	Warakapola	2
Kegalle	Algama	Warakapola	2
Kegalle	Dedigama	Nelundeniya	2
Kegalle	Nelundeniya	Nelundeniya	2
Kegalle	Aluthnuwara	Mawanella	2
Kegalle	Lewangama	Pindeniya	2
Galle	Pitigala	Pitigala	2
Galle	Hiniduma	Hiniduma	2
Galle	Weerapana	Pitabeddara	2
Galle	Talgampola	Talgampola	2
Galle	Magedera	Talgampola	2
Galle	Kahaduwa	Batapola	2
Galle	Horangalla	Batapola	2
Galle	Mapalagama	Batapola	2
Matara	Morawaka	Pitabeddara	2
Matara	Siyambalagoda	Pitabeddara	2
Matara	Imaduwa-Ibbawala	Akuressa	2
Ratnapura	Malwala	Ratnapura	2
Ratnapura	Wilakoladeniya	Ratnapura	2
Ratnapura	Batatota	Ratnapura	2
Ratnapura	Kuruwita	Ratnapura	2
Ratnapura	Teppanawa	Kiriella	2
Ratnapura	Mudunkotuwa	Kiriella	2
Ratnapura	Eheliyagoda	Eheliyagoda	2
Ratnapura	Ellawala	Eheliyagoda	2
Ratnapura	Dippitigala	Pelmadulla	2
Kandy	Hataraliyadda	Galagedera	2
			1,88

. of lings Group	KIND OF RUBBER (ACRES)				Smallest & Largest Holding (Acres)	DUSTING		Machine Used
	Budded	Clonal Seedling	Ordinary Seedling	Total		Started	Concluded	
5	87	1½	—	88½	½—9½	30.1.59	25.3.59	Kestrel
4	90½	1½	9	101	1—31	11.2.59	21.3.59	Kestrel
9	75¼	18	—	93¼	1—15	30.1.59	10.3.59	Kestrel
9	53	—	19½	72½	1—7	9.2.59	23.3.59	Kestrel
7	87	1	7	95	1—9	7.2.59	17.3.59	Kestrel
3	84½	—	—	84½	1—15½	7.2.59	2.4.59	Kestrel
3	86½	3½	18	108	½—12	2.2.59	18.3.59	Kestrel
5	83	4	14½	101½	½—7	3.2.59	19.3.59	Kestrel
0	91	4	7¼	102¼	¼—10	28.1.59	19.3.59	Kestrel
2	70¾	11½	18½	100¾	¾—18	17.2.59	26.3.59	Mistral
6	79	11½	8¼	98¾	½—22	3.2.59	25.3.59	Mistral
4	105½	—	3	108½	1—15	26.1.59	24.3.59	Mistral
9	45	11½	52	108½	½—23	5.2.59	25.3.59	Mistral
7	82¾	11½	3	97¼	¾—10	13.2.59	24.3.59	Mistral
5	114¼	—	2	116¼	½—7	9.2.59	13.3.59	Mistral
7	114¾	—	5½	120½	1—11	14.2.59	28.3.59	Mistral
8	102¾	—	10	112¾	¾—9½	14.2.59	28.3.59	Mistral
4	64¾	19	8	91¾	½—8	6.2.59	6.4.59	Mistral
3	94	1	1	96	½—8	15.2.59	1.4.59	Mistral
0	85½	6	9	100½	1—9	1.3.59	4.4.59	Mistral
4	51¾	32	6	89¾	1—13	9.2.59	15.3.59	Mistral
3	82¾	4½	5¾	93	½—9¾	10.2.59	23.3.59	Mistral
6	58	7¾	36½	102¼	1—9	5.2.59	10.4.59	Mistral
6	71	2½	7½	81	½—27	13.2.59	24.3.59	Mistral
6	48	29	—	77	5—29	13.2.59	26.3.59	Mistral
8	65	16	—	81	7—16	11.2.59	25.3.59	Mistral
9	70	7½	17	94½	½—12	19.2.59	28.3.59	Mistral
1	89	10	—	99	3—17½	13.2.59	19.3.59	Mistral
6	11	42½	30	83½	½—7½	7.2.59	23.3.59	Mistral
7	75¾	3¼	14½	93½	¾—24	9.2.59	19.3.59	Mistral
0	120½	9	7	136½	¾—12	10.2.59	27.3.59	Mistral
1	81¼	—	5¼	86¾	¼—5	6.2.59	10.3.59	Mistral
1	87¼	—	—	87¼	1—8	9.2.59	13.3.59	Mistral
4	48¾	3	47¾	99¾	¼—9	10.2.59	13.3.59	Mistral
8	60¾	2	24½	86¾	¾—8	5.2.59	13.3.59	Mistral
7	71¾	—	3	74¾	1—16	13.1.59	17.3.59	Kestrel
5	71¾	—	8	79¾	½—4	31.1.59	6.3.59	Mistral
1	81¾	—	3	84¾	1—11	1.2.59	14.3.59	Mistral
4	76¼	—	1¼	77½	¾—8½	31.1.59	19.3.59	Mistral
7	77¼	—	—	77¼	¼—11	9.2.59	14.3.59	Mistral
2	61¾	—	—	61¾	¼—5½	26.1.59	11.3.59	Kestrel
5	68	—	37	105	3—22	26.1.59	7.3.59	Mistral
8	83	1½	1	85½	½—7	9.2.59	14.3.59	Mistral
2	79	—	3	82	¾—12	2.2.59	7.3.59	Mistral
4	48	18	21	87	1—8	25.1.59	12.3.59	Mistral
2	64	—	9¼	73¼	1—8½	9.2.59	27.3.59	Mistral
1	76	5	27	108	2—20	14.2.59	27.3.59	Mistral
8	54¾	11	8½	74¼	½—10	16.2.59	3.4.59	Mistral
4	86¾	—	—	86¾	1½—14	6.2.59	29.3.59	Mistral
1	84¼	—	5	89¼	3—20	4.2.59	22.3.59	Mistral
9	92¾	3	3¼	99	1—30	3.2.59	18.3.59	Mistral
1	65¼	4¼	26	96	½—14	14.2.59	26.3.59	Mistral
8	75½	4	—	79½	1—25	20.2.59	30.3.59	Mistral
5	100	—	—	100	2½—13	13.2.59	7.4.59	Mistral
7	73	19	—	92	2—23	5.2.59	25.3.59	Mistral
8	109½	3¾	2	115¼	½—30	29.1.59	3.4.59	Mistral
2	75	18	9¾	102¾	¾—28	7.2.59	26.3.59	Mistral
3	71½	—	33½	104¾	1—16½	6.2.59	31.3.59	Mistral
8	77½	22½	10½	110½	½—15	16.2.59	26.3.59	Mistral
3	13¾	—	66	79¾	1—17	23.1.59	24.3.59	Mistral
7	59	8	42	109½	1¾—19	4.2.59	29.3.59	Mistral
3	37½	29¾	25	92¼	½—16½	16.2.59	22.3.59	Mistral
1	47	21½	20½	89	½—13	9.2.59	18.3.59	Mistral
2	75½	5	13	93½	1—8	9.2.59	19.3.59	Mistral
1	72	9	5½	86½	½—16	9.2.59	20.3.59	Mistral
1	88¼	3	—	91¼	½—6½	10.2.59	24.3.59	Mistral
2	64¾	5¾	—	70½	½—8	26.1.59	7.3.59	Mistral
4	4,999½	466¼	781	6,246¾				

PLANTING TOPICS

YIELD STIMULATION OF RUBBER TREES

Stimulation for economic increased yields of budded and seedling rubber trees yielding below 800 lb. dry rubber per acre per year is of considerable importance to the rubber industry of Ceylon, especially in cases where no definite programme has been laid down for replanting or where high intensity tapping systems on a short term policy cannot be adopted.

A considerable acreage of old unselected seedling rubber of 40 years of age and over is being tapped at an intensity below 200 per cent. This type of rubber with satisfactory renewed bark and good standards of tapping is yielding from 350 to 500 lb. dry rubber per acre per year at the present time and may be expected to give economic returns in increased yields, if the correct procedure of yield stimulation is adopted.

There is also a fair acreage of pre-war plantings of budded rubber yielding 600 to 700 lb. of rubber per acre per year. These trees which are now about 20 years of age, and in tapping on bark of first renewal would be expected to respond very favourably to yield stimulation.

Increased yields from young rubber trees by stimulation results in a severe setback in growth. Yield stimulation of young rubber trees cannot, therefore, be recommended under any circumstances.

An experiment carried out on budded rubber planted in 1936 on Dartonfield Estate and treated with yield stimulants containing the synthetic growth substance 2, 4, 5-T as the active ingredient, has given increased yields of nearly 30 per cent over the control in the first six months after treatment. The applications are made on scraped bark below the tapping cut once in 6 months and the trees are tapped on the S/2, d/2, 100% system. A 2, 4, 5-T proprietary preparation which is applied on unscraped bark below the tapping cut gave only a 9 per cent increase in yield over the control and a proprietary preparation of thick consistency with 2, 4-D as the active ingredient gave a 16 per cent increase in yield over the control in the same experiment.

The quality of renewed bark is a limiting factor in obtaining increased yields with yield stimulation. Bark which is less than $6\frac{1}{2}$ mm. in thickness will not stand up to the depth of scraping required for proprietary stimulants of thick consistency and poor penetrating properties.

In our experience the maximum amount of scraping which is safe for our wet weather conditions reduced this thickness of the bark to one of approximately 5.5 mm., which is just sufficient for satisfactory tapping.

It is not possible to forecast with any accuracy the level of increased yields obtained by yield stimulation from the results of a limited number of small experiments as so much depends on the condition of the bark treated with the stimulant. The best response is always obtained from virgin bark and from well renewed bark.

The extent of bark scraping for application of stimulants, as measured vertically, should not exceed $1\frac{3}{4}$ inches on alternate daily tapping which, with a bark consumption of about 7 inches a year under Ceylon conditions, is tapped out in three months before the stimulant has any adverse effects on the bark, especially in the wetter districts of Ceylon where the incidence of *Phytophthora* bark disease can be high on certain clones.

The correct depth of light scraping on virgin and renewed bark can be determined by first scraping off the corky bark and then continuing to scrape, with a steel wire brush or scraper, until the typical reddish layer is exposed. The first pin points of latex will indicate that the scraping is sufficient in a particular area of the bark; any excessive drip of latex from points will indicate that the required depth of scraping has been exceeded. Labour can be trained in a few hours to keep to the correct depth of scraping.

Any latex exuding from the bark after scraping should be carefully removed before the stimulant is applied. This latex should be allowed to coagulate on the bark and this may be ensured by allowing a suitable interval of time to elapse between scraping and application of the yield stimulant.

Stimulants of thin consistency can be applied with a flat 1-inch paint brush, and those of thicker consistency may be applied with the forefinger taking off any excess with pressure on the finger. In all cases it is important that the applications be made thinly and evenly. Any indiscriminate daubing of the yield stimulant will result in adverse effects on the bark, especially under the climatic conditions of the wet low-country districts.

In the case of trees tapped on a half-spiral cut alternate daily, S/2, d/2, 100%, the stimulant can be applied on a scraped strip of bark $1\frac{3}{4}$ inches wide below the cut once in 6 months if the area is to be replanted within the next 10 years. If there is no definite replanting programme for a particular area it would be best to carry out the stimulation once a year.

On trees tapped on double-cut systems of up to 133 per cent intensity the applications can be made over a scraped area $1\frac{1}{2}$ inches wide below each cut for downward tapping.

On old unselected seedling rubber it may be more economical to exploit the virgin bark above the normal tapping panel for increased yields. The double-cut systems will then be introduced with one downward half-circumference cut on the normal tapping panel, and one high half-circumference cut on the opposite panel which will be tapped from a height of about 7 feet with the aid of a ladder. The applications will be made as for double-cut systems on a scraped area of $1\frac{1}{2}$ inches wide below the cut on the bark to be tapped.

On high level tapping a pronounced drop in yield normally occurs as the tapping cut approaches the junction of virgin bark and renewed bark, especially if the renewed bark is poor. This fall in yield may be greatly reduced by stimulation of the virgin bark island.

Up to the present this Institute has had no old unselected seedling rubber on which to carry out yield stimulation experiments but the impending acquisition of a block of about 200 acres of old seedling rubber would provide the type of old rubber on which to carry out in 1960 these experiments on a commercial scale, with the necessary controls for an accurate assessment of the effect of yield stimulation on old seedling rubber under Ceylon conditions.

C. A. de S.

QUESTION CORNER

Question: In your introduction to your recommendations on manuring you state:

“Recommendations for manuring of rubber, as for any other crop, have to be considered in the light of several factors. Therefore, it must be emphasized at the very outset that no single fertilizer mixture recommended for general use can be the best mixture under all conditions.”

You have then differentiated between different types of soils. Are you seriously recommending planters to use various mixtures and to determine the optimal mixtures for soils of his own estates? Is this not a counsel of perfection?

In the manure mixtures you have recommended, there appear to be a difference in potash only. Do the different soil types you mention only require a different quantity of Potash? Are these mixtures well balanced for the different soil types? Have you any statistically examined data on which you have based your recommendations?

Since PB 86 showed signs of Magnesium deficiency even when we used the old R 215 mixture which contained less Potash than your new 4:6:2 mixture, on what data have you changed the general mixture 4:6:5 plus Magnesium or Calcium and Magnesium (Dolomite) ?

Is not PB 86 a poor uptaker of Magnesium with or without Potash?

Answer: The nature and the number of questions you have asked call for a lengthy reply.

You will, I think, agree that no single fertilizer mixture recommended for general use can be the best mixture under all conditions and that it would not be practically feasible for us to recommend a separate mixture for every conceivable variation that manifests itself in the conditions for the cultivation of rubber.

This practical difficulty is implied in your first question, though in fact planters are now required to differentiate only six variations in soils and two variations in cultivation practices for determining the correct type of fertilizer mixture. We expect planters to be able to do this without difficulty. The smallholders will be advised by our field staff. When there is any difficulty this Institute can always be consulted. In actual practice the planters will be required to contend with perhaps four fertilizer mixtures at the maximum, and very often it should be only one or two. Is this asking too much from the planters in Ceylon, when we hear that in Indochina a special fertilizer programme may be recommended for each clone or field based on the analysis of samples of leaves and latex?

Our recommendations for manuring are based on the results obtained from field experiments laid down on a statistical basis. The optimal quantities of Nitrogen and Phosphate as prescribed now is the summation of the results of our investigations over a period of years. Although the optimal requirements for Nitrogen and Phosphate have varied within limits in experiments conducted on different areas, these differences have not been considered significant enough to necessitate a change

in the composition of fertilizer mixtures for rubber in respect of these nutrients, taking also into consideration the practical difficulties that will arise if the number of mixtures are unnecessarily increased.

Favourable responses have also been obtained by the inclusion of Potassium in fertilizer mixtures. Generally the need for Potassium is greater on light sandy soils than on heavier soils. But unlike Nitrogen and Phosphate, the application of Potassium to areas that do not need it may lead to a depressive effect on growth. It has also been recorded that due to the phenomenon of "ion antagonism" the antagonistic action of Potassium on the uptake of Magnesium by plants can aggravate a deficiency of Magnesium. Therefore it is important that the proportion of Potassium in NPK mixtures should be worked out carefully. For the reasons adduced above it has been deemed necessary to vary the Potash content, and not the Nitrogen and Phosphate content, in the fertilizer mixtures we have recommended.

According to the present state of our knowledge the mixtures that have been recommended are well balanced for the healthy growth of rubber under the different soil conditions that prevail in the rubber growing areas in Ceylon.

We do not have any experimental evidence to support the belief that "PB 86 is a poor uptaker of Magnesium." If PB 86 showed Magnesium deficiency symptoms irrespective of the fact that an NPK mixture, either high or low in Potash was applied, *the obvious answer is to supply the Magnesium.* This is exactly what we have done in our latest recommendations. For Potassium deficient areas we have recommended the high Potash mixtures with the addition of equally high amounts of Magnesium to the mixture. But in areas where there is no need for high Potash it is unnecessary to apply a high Potash mixture for the following reasons:—

1. The Potash applied will be in excess of requirements and there is likely to be a wastage.
2. Due to the phenomenon of "ion antagonism" high Potash mixture will have to contain high proportions of Magnesium merely to counteract the effects of high Potash in the mixture.
3. A NPK mixture high in Potash and Magnesium will be poorer in Nitrogen and Phosphate content than a NPK mixture low in Potash and Magnesium.

The following example will help to illustrate this point:—

One pound of each of the fertilizer mixtures R 4:6:2 + Mg. and R 4:6:5 + Mg. will contain the following equivalents of nutrients;

	R 4:6:2 + Mg.	R 4:6:5 + Mg.
N	1.37 oz.	1.10 oz.
P ₂ O ₅	1.90 oz.	1.52 oz.
K ₂ O	0.66 oz.	1.33 oz.
MgO	0.21 oz.	0.42 oz.

The reasons for not recommending a high Potash mixture as a general mixture, irrespective of requirements, should now be apparent.

A. J. J.

Question: What are your recommendations for the elimination of mould infection in drying sheds?

Answer: Often during the wet season heavy mould infection will be found especially in unheated drying sheds where moist conditions are a continuous cause for mould development on lace crepe. Mould can grow on the surface of the lace crepe forming dusty layers which may penetrate into the rubber and result in the appearance of pink, orange, yellow, red, purple or black spots which cannot be eliminated. Outbreaks of mould may occur even in smokehouses where the drying is delayed by too low a temperature or by prolonged handling time during which the smokehouse is not heated.

Mould is of common occurrence and will grow on all wooden parts, on the walls, and sometimes even on metal under humid conditions.

For the elimination of mould in drying sheds and smokehouses the following procedures can be recommended:—

(1) Spraying of a 1% solution of formalin on all parts inside the drying shed, including walls, floor and roof. It does not matter if some rubber inside the shed is contaminated with the spray. But it is important to see that after the removal of the lace crepe even the “reapers” are disinfected.

(2) For smokehouses a spray of a 0.5% solution of paranitrophenol (PNP) may be applied in place of formalin. In this case it is advisable to empty the smokehouse first. PNP is not suitable for crepe drying houses because of its intensive yellow colour.

(3) A very effective method is to evaporate $\frac{1}{2}$ –1 gallon of concentrated formalin (about 38%) in the closed drying shed or in the smokehouse and to keep it closed for about 24 hours. For the evaporation, the formalin is heated in an open tin or some other suitable container on a small charcoal fire. The gaseous formaldehyde penetrates into all the crevices of the wood and the walls and destroys all moulds effectively.

K. F. H.

RUBBER RESEARCH INSTITUTE OF CEYLON

Minutes of the 162nd meeting of the Rubber Research Board held at 10-00 a.m., on Saturday, 23rd May, 1959, in the Board Room of the Rubber Control Department, Eastern Bank Building, Fort, Colombo.

Present:—Mr. S. Pathmanathan (in the Chair), Mr. H. Creighton, Mr. L. C. de Mel, Mr. W. P. H. Dias, J.P., Mr. V. T. G. Karunaratne, M.P., Mr. D. G. L. Misso (Acting Deputy Secretary to the Treasury), Mr. C. A. de Silva (Acting Director) and Mr. C. D. de Fonseka (Chief Administrative Officer).

Apologies for absence were received from Mr. G. H. Carter and Senator E. W. Kannangara.

1. **Board.**—The Chairman welcomed Mr. D. G. L. Misso, Acting Deputy Secretary to the Treasury, who had been nominated to serve on the Board during the absence on leave of Mr. H. E. Peries, Deputy Secretary to the Treasury, with effect from 2nd April, 1959.

2. Minutes:

(a) *Confirmation.*—Draft minutes of the meeting held on 25th March, 1959, which had been circulated to members, were signed by the Chairman.

(b) *Matters arising from the minutes:*

1. *Purchase of a Sub-Station.*—Further arrangements were discussed in regard to the acquisition of 200 acres of an estate in the Sabaragamuwa District.

3. **Administrative Committee.**—The recommendations made by the Committee at its meeting held on 13th May, 1959, were approved and the following decisions were arrived at on the basis of these recommendations:—

(a) *Estate Superintendent's Reports January to March, 1959*—were approved.

(b) *Estate Accounts December, 1958 to February, 1959*—were approved.

(c) *Visiting Agent's Report*—was approved.

(d) *Supplementary Votes*—were passed for the use of pudlo in new buildings and for the additional funds required for the construction of 3 double cottages for labourers.

(e) *Ceylon Association of Science Exhibition.*—Agreed that the Institute should participate in the exhibition to be held during September, 1959.

(f) *Request from the University College of Ghana.*—The Acting Director was authorised to supply a small quantity of rubber budwood and clonal seeds to the Faculty of Agriculture of the University College of Ghana in exchange for material of West African Amelonada Cocoa supplied to Ceylon.

(g) *Board Meeting.*—Agreed that the meeting be postponed from 22nd to 23rd May, 1959, as the 22nd is a public holiday.

4. **Reports and Accounts—The Balance Sheet and End of Year Accounts for 1958** were considered together with the Auditor-General's report thereon. These were adopted and covering sanction was granted for over-expenditure incurred on certain votes.

5. **Staff**—Changes in staff since the last meeting were reported and approved.

6. **Publications.**—The following publications were tabled:—

Advisory Circular No. 63—Brown Root Disease of Hevea, Fomes Noxius.	
” ” 64—Bark Rot and Canker of Hevea, Phytophthora Palmivora.	
” ” 65—The Phytophthora Leaf Disease of Hevea, Phytophthora Palmivora.	

The meeting then terminated.

RUBBER RESEARCH INSTITUTE OF CEYLON

Minutes of the 163rd meeting of the Rubber Research Board held at 10 a.m., on Friday, 24th July, 1959, in the Board Room of the Rubber Control Department, Eastern Bank Building, Fort, Colombo.

Present:—Mr. S. Pathmanathan (in the Chair), Mr. G. H. Carter, Mr. L. C. de Mel, Mr. W. P. H. Dias, J.P., Mr. V. T. G. Karunaratne, M.P., Mr. H. E. Peries (Deputy Secretary to the Treasury), Mr. B. Mahadeva (Rubber Controller) and Dr. E. D. C. Baptiste (Director).

The Chief Administrative Officer, Mr. C. D. de Fonseka was represented by the Office Assistant, Mr. J. A. Attygalle.

An apology for absence was received from Mr. H. Creighton.

1. **Board—Changes in membership.**—The following changes in membership were reported:—

(a) Mr. D. F. Hettiarachchi had been nominated to serve on the Board by the Hon'ble Minister of Agriculture and Food with effect from 15th June, 1959. Mr. V. T. G. Karunaratne had been nominated in place of Mr. Hettiarachchi by the Hon'ble Minister of Agriculture and Lands with effect from 29th June, 1959, for a period of 3 years or for such period as he continues to be a member of the House of Representatives, whichever period may be the shorter.

(b) Mr. H. E. Peries, Deputy Secretary to the Treasury, had returned from leave with effect from 28th June, 1959, relieving Mr. D. G. L. Misso, who had acted for him.

The Chairman thanked Mr. Misso for his services during his period of membership. He welcomed Mr. H. E. Peries and Dr. E. D. C. Baptiste on their return from leave and Mr. V. T. G. Karunaratne, M.P., on his renomination to serve on the Board.

2. Minutes:

(a) *Confirmation.*—Draft minutes of the meeting held on 23rd May, 1959, which had been circulated to members were signed by the Chairman.

(b) *Matters arising from the minutes:*

1. **RESEARCH ASSISTANTS.**—Agreed that the posts of Research Assistant be advertised and a Selection Committee consisting of the Chairman, Mr. B. Mahadeva, Mr. H. E. Peries and the Director was appointed to interview candidates.

2. **CEYLON ASSOCIATION OF SCIENCE EXHIBITION.**—Agreed that the Institute should not participate in the above exhibition due to lack of time.

3. **BALANCE SHEET AND REVOTE OF CAPITAL VOTES FOR 1958.**—Agreed that balances of unexpended Capital Votes be revoted for 1959.

4. **PURCHASE OF SUB-STATION.**—Arrangements made to acquire 200 acres of an estate in the Ratnapura district through the Hon'ble Minister of Agriculture and Lands were noted and agreed that Director should visit this estate in the company of Mr. W. P. H. Dias, for inspection.

3. **Salaries Committee.**—Recommendations made at the meeting held on 2nd June, 1959, were approved subject to the following comments:—

(a) *Manual of Procedure.*—Agreed that it would be desirable to have a Manual of Procedure and it was decided that the work in connection with the compiling of a Manual be started after the Tea Research Institute's draft Manual is available.

(b) *Designations.*—Designations of Smallholdings Advisory Officer and District Field Officer were changed to Chief Advisory Officer Smallholdings and Divisional Advisory Officer respectively.

(c) *Ayurvedic Treatment.*—Agreed that, in future, Medical Claims in respect of the following need not have the Director's prior approval:—

1. Treatment from Ayurvedic Hospitals and approved registered Ayurvedic Dispensaries run by local bodies.

2. Treatment in respect of accidents while on duty.

4. **Building Committee.**—Recommendations made by the Committee at its meeting held on 29th June, 1959, were approved and contracts for the construction of the following buildings were awarded:—

1. Assistant Staff Grade II Bungalow at Hedigalla.
2. Extension to I.S. Bungalow No. 3 at Dartonfield.
3. Extensions to Assistant Staff Bungalows Nos. 16 and 17 at Dartonfield.
4. Two enclosed Garages at Dartonfield.
5. Sulphur and Manure Shed at Dartonfield.

5. **Smallholdings Committee.**—Recommendations made at the meeting held on 17th July, 1959, were approved subject to the following comments:—

(a) *Sulphur Dusting Proposals 1959/60.*—Noted that this would cover an extent of 8,000 acres involving a total expenditure of Rs. 100,000/—, half of which would be met from the Government Grant for Smallholdings and the balance from the Institute's funds.

(b) *Village Propaganda Work.*—The plan drawn up by the Chief Advisory Officer Smallholdings for audiovisual instructions in connection with the expanding

of propaganda activities of the Advisory Department direct to the villages was approved.

6. **Smallholdings Selection Committee.**—Recommendations made at the meetings held on 22nd June and 17th July covering the appointments of five Temporary Rubber Instructors and an Artist-Clerk were approved.

7. **Reports and Accounts Receipts and Payments Account for the 1st Quarter 1959**—was approved.

8. **Staff:**

(a) *Resumption of duties:—*

1. Reported that Dr. E. D. C. Baptiste, Director, had returned from leave on 19th July and had resumed duties on 20th July, 1959.
2. Reported that Dr. A. Riggenbach, Plant Pathologist, had resumed duties with effect from 22nd June, 1959, after his end of contract leave.
3. Reported that Mr. L. Wijegunawardena, Estate Superintendent, had resumed duties on 1st June, 1959, after his end of contract leave.
4. It was reported that Mr. M. Nadarajah, Research Assistant, Chemistry Department, had returned to Ceylon and had assumed duties on 1st June, 1959, on completion of his training at Birmingham University and obtaining the M.Sc. degree.

(b) *Director's visit to Vietnam and Cambodia.*—The Director gave an account of his visits to research stations in Vietnam, Cambodia and France where he had been cordially welcomed. A particularly interesting visit was at the Institut des Recherches sur le Caoutchouc au Vietnam (I.R.C.V.) at Laikhê where the work on "diagnostic physiologique" was fully discussed.

(c) *Assistant Plant Pathologist.*—Noted that arrangements are being made for the Assistant Plant Pathologist to proceed to Bristol University for a post-graduate training.

(d) *Assistant and Minor Staff Changes.*—Changes in staff since the last meeting were reported and approved.

9. **London Advisory Committee.**—Minutes of the 12th meeting of the Agricultural Sub-Committee held on 20th April, 1959, were tabled. On behalf of the Board the Chairman extended their congratulations to Professor G. E. Blackman, a member of the L.A.C. Agricultural Sub-Committee, on his election to the Fellowship of the Royal Society.

10. **Publications.**—The following publications were tabled:—

- (a) First Quarterly Journal March, 1959.
- (b) Advisory Circular No. 66—Manuring of Rubber.

11. **Any other business Phytophthora Discussion.** It was agreed that a discussion be held in Colombo in three or four months' time to discuss the problem of Phytophthora Leaf and Bark Diseases.

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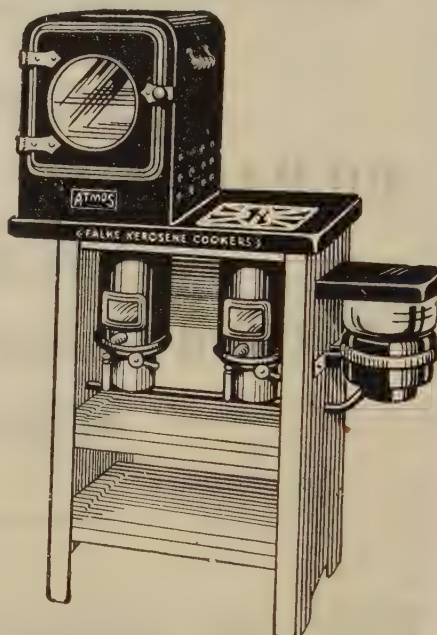
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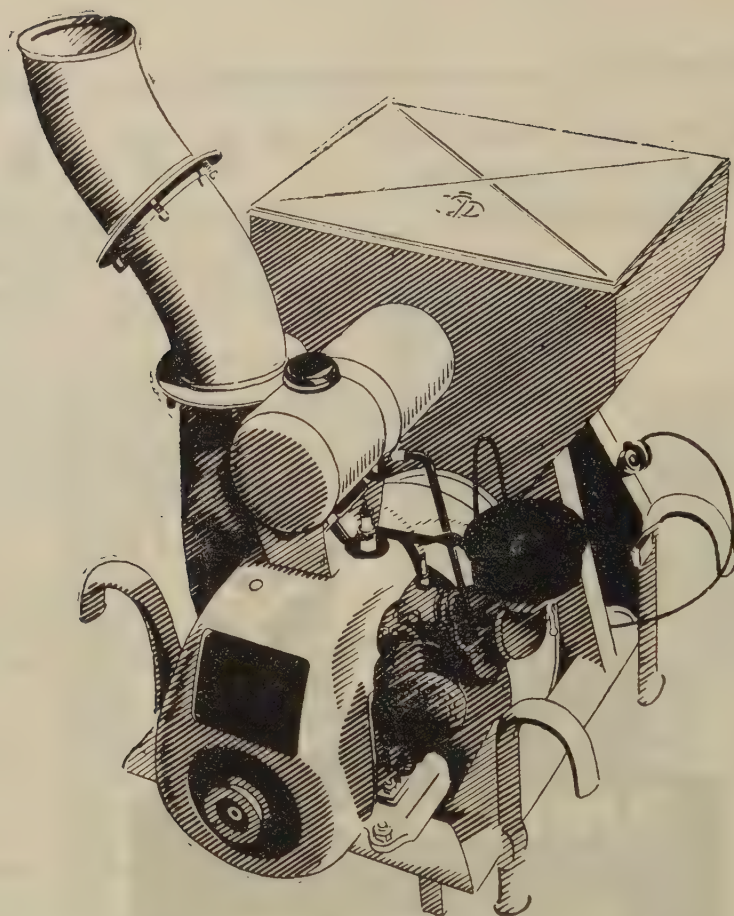


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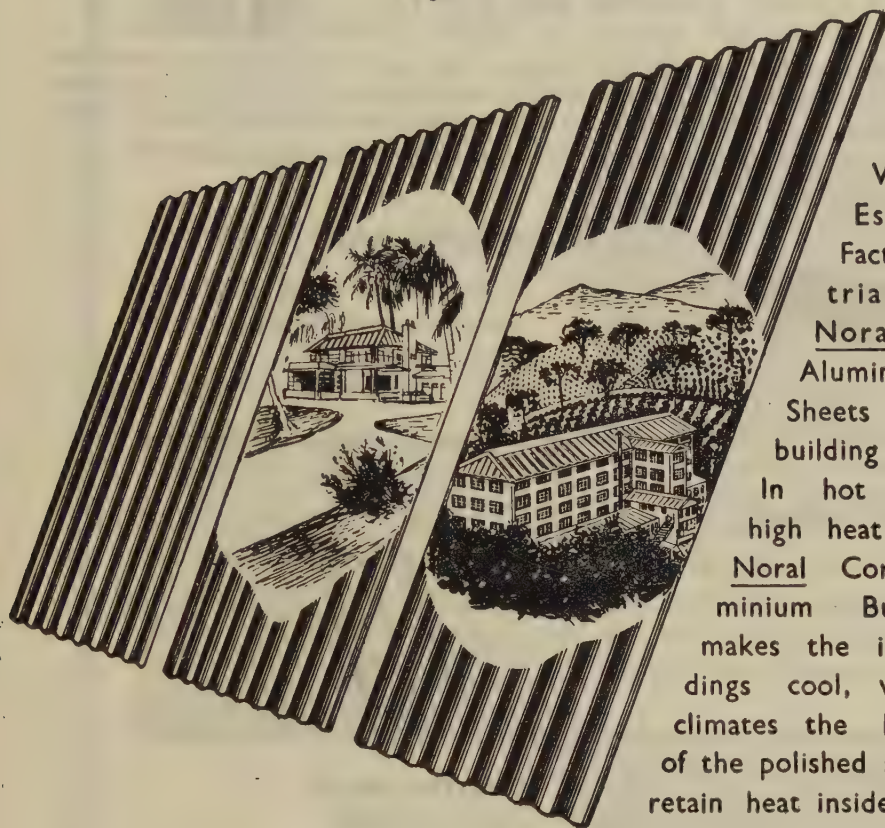
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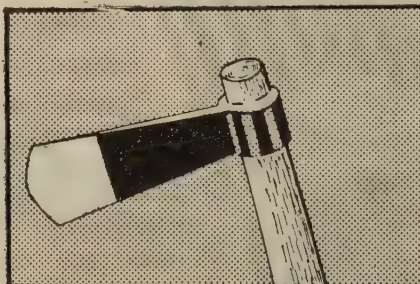
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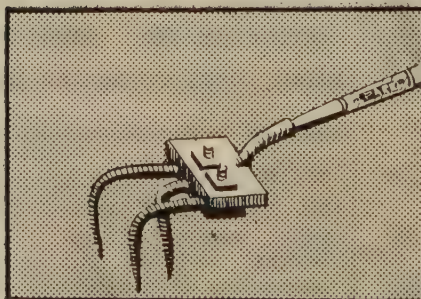
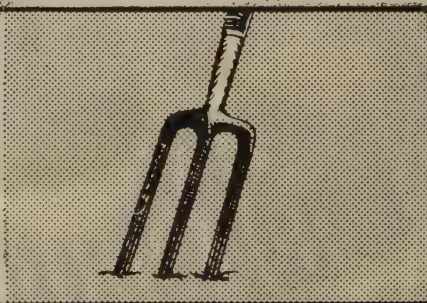


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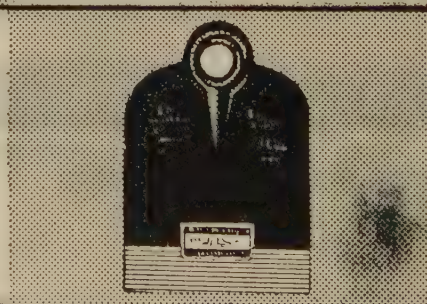


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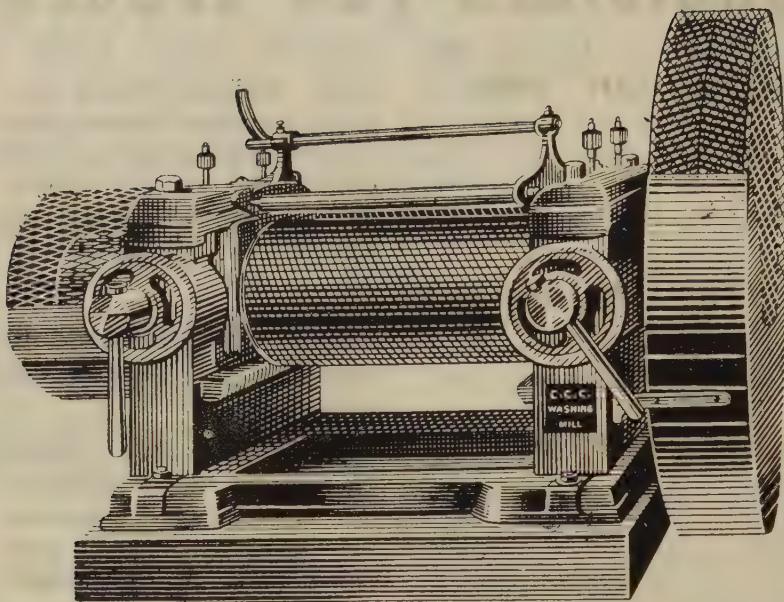
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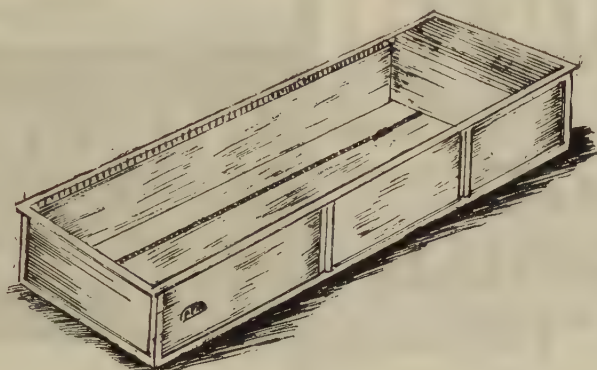
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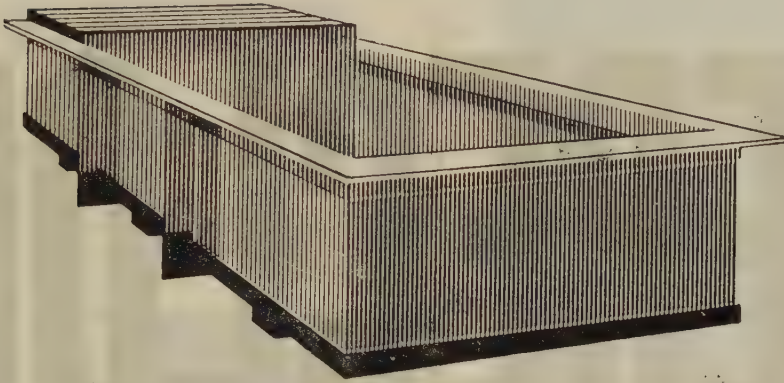
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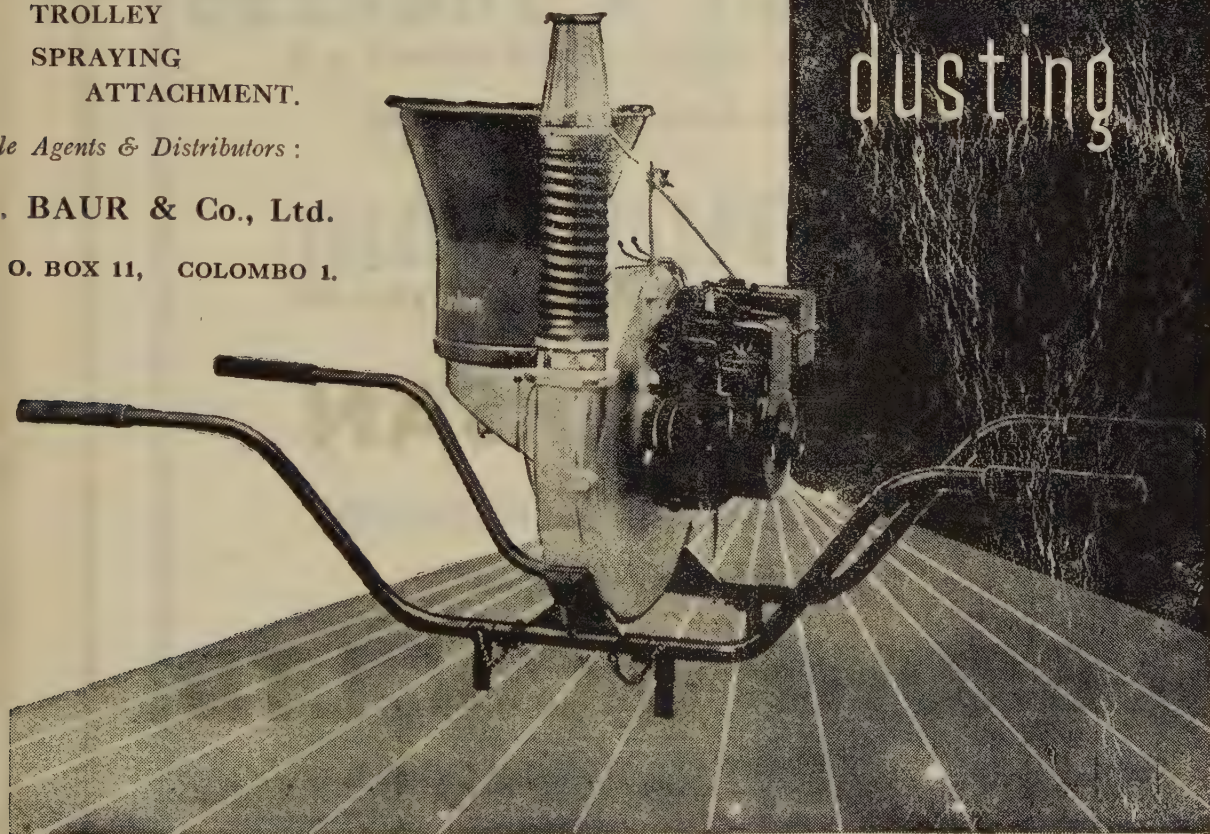
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